

Claims

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- 1. Method for a digital transmission system, in which a first and second known symbol sequence ($\{s_1, s_2, ..., s_M\}$) are transmitted, the frequency offset (ΔF) of the transmission system is estimated by comparing a first section (1f_M) of the received signal (r) corresponding to the first symbol sequence with a second action (2f_M) of the received signal (r) corresponding to the second symbol sequence, and the square of the absolute value of a pulse response (h) of the transmission system is reduced in a time domain in order to lessen the influence of symbols (x) adjacent to the first or second known symbol sequence ($\{s_1, s_2, ..., s_M\}$) on the first and second section (1f_M , 2f_M), respectively, of the received signal (r).
- 2. Method according to Claim 1, in which the first and second symbol sequence $(\{s_1, s_2, ..., s_M\})$ are selected to be identical to one another.
- 3. Method according to Claim 1 or 2, in which the reduction in the square of the absolute value of the domain of the pulse response (h) of the transmission system is undertaken with the aid of a filter (14).
- 4. Method according to Claim 3, in which a pulse response (h) of the transmission system is estimated.
- 5. Method according to Claim 4, in which coefficients of the filter (14) are determined and/or adapted by means of the estimated pulse response (h).
 - 6. Method according to Claim 6, in which the pulse response (h) is shortened.
- 7. Method according to Claims 1, 2, 4, 5, or 6, in which the energy of a domain of the pulse response (h) of the transmission system relative to the total energy of the pulse response (h) is reduced with the aid of an all-pass filter (14).
- 8. Method according to Claim 7, in which the all-pass filter (14) is adapted to achieve a low-phase pulse response of the transmission system.
- 9. Method according to Claim 8, in which one value (${}^{1}f_{M}$, ${}^{2}f_{M}$) of the first and second section of the received signal (r) is determined by sampling the received signal (r).
- 10. Method according to Claim 9, in which the angular difference $(\Delta \phi)$ in the complex plane between the first and second sample $(^1f_M, ^2f_M)$ is used to estimate the frequency offset (ΔF) .

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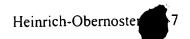
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1	11. Method according to Claim 10, in which several pairs of samples ([1f1, 2f1],
2	$[^1f_2, ^2f_2],, [^1f_M, ^2f_M])$ are averaged over the angular differences ($\Delta \phi$).

- 12. Method according to Claim 11, in which the signals are transmitted in blocks, in particular in accordance with a GSM standard and/or EDGE standard.
- 13. Device (1) for a digital transmission system, comprising a transmitting device for transmitting a first and second known symbol sequence ($\{s_1, s_2, ..., s_M\}$), and means (15) for comparing a first section (1f_M) of the received signal (r) corresponding to the first symbol sequence with a second section (2f_M) of the received signal (r) corresponding to the second symbol sequence, as a result of which it is possible to estimate the frequency offset (ΔF) of the transmission system, characterized in that the device (1) comprises a first module (14) for reducing the square of the absolute value of a pulse response (h) of the transmission system in a time domain, it being possible by means of the reduction to lessen the influence of symbols (x) adjacent to the first or second known symbol sequence ($\{s_1, s_2, ..., s_M\}$) on the first and second section (1f_M , 2f_M), respectively, of the received signal (r).
- 14. Device (1) according to Claim 13, in which the first and second symbol sequence $(\{s_1, s_2, ..., s_M\})$ are identical to one another.
- 15. Device (1) according to Claim 13 or 14, in which the first module (14) comprises a filter.
- 16. Device (1) according to Claim 15, which comprises a second module (11) for estimating a pulse response (\hat{h}).
- 17. Device (1) according to Claim 16, which comprises a third module (12) for determining and/or adapting suitable coefficients of the filter (14).
- 18. Device (1) according to Claim 17, in which the pulse response (h) can be shortened by means of the first module (14).
- 1 19. Device (1) according to Claim 18, in which the first module (14) comprises an 2 all-pass filter.
- 20. Device (1) according to Claim 19, in which the all-pass filter (14) can be adapted to achieve a low-phase pulse response of the transmission system.



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- 21. Device (1) according to Claim 20, which comprises a sampling device for the received signal (r), with the aid of which one value (¹f_M, ²f_M) of the first and second section of the received signal (r) can be sampled.
- 22. Device (1) according to Claim 21, which comprises means (16) for estimating the frequency offset (ΔF) from the angular difference ($\Delta \phi$) in the complex plane between the first and second sample (1f_M , 2f_M).
- 23. Device (1) according to Claim 22, which comprises means for determining an average value of the angular differences ($\Delta \phi$) of several pairs of samples ([1f_1 , 2f_1], [1f_2 , 3 2f_2], ..., [1f_M , 2f_M]).
 - 24. Device (1) according to Claim 23, which is adapted for transmission in blocks, in particular in accordance with a GSM standard and/or EDGE standard.